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TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION U.S. DEPARTMENT OF AGRICULTURE FOREST SERVICE

No. 580

The Poplar Borer in Relation to Aspen Stocking

Increased interest in better management of aspen has focused attention on the amount of damage caused by primary pests and on silvicultural methods that will minimize the damage. One of these pests, the poplar borer (*Saperda calcarata* Say), is a roundheaded borer found in the majority of aspen stands throughout the Lake States. The large, oval-shaped larval tunnels of this pest make trees susceptible to wind breakage, serve as openings for the introduction of various rots and decays, and cause a degrade in log value.

Successful borer attacks are almost always concentrated in individual trees or small groups of trees unevenly distributed throughout the stand. These "brood trees" are usually the larger, faster growing trees in stands that average between 3 and 7 inches d.b.h. (diameter at breast height). However, preliminary investigations have failed to reveal any gross differences in size or growth rate between adjacent attacked and unattacked trees. It has been suggested that the initial successful attack occurs on a random basis; successive generations then tend to attack the same tree.^{1/} After heavy repeated attacks, brood trees remain alive but are abandoned by the borers and only their blackened, scarred trunks give evidence of their previous inhabitants.

Because of the uneven distribution of attacked stems, the variation in percentage of poplar borer infestation on small plots in a given area is very large; therefore impact data based on a relatively small number of small plots cannot be interpreted with great confidence. However, analysis of data from 145 tenth-acre plots in the northern portions of the Lake States shows certain trends in infestation that may at least serve as a starting point for future research. These plots were established by the Station during the early 1950's to investigate Hypoxylon canker, but data on the occurrence of the poplar borer were also recorded and are used here.

Of the 145 plots, 42 contained no attacked stems, 77 had from 1 to 10 percent of the total stems infested, and the remaining 26 had 11 to 65 percent infestation. No attempt was made to differentiate between heavily and lightly attacked stems because generally successive generations of the borer heavily infest all attacked trees.

When the plots were grouped according to d.b.h. class, a definite pattern emerged: the larger the average d.b.h., the higher the poplar borer infestation (fig. 1). Although plots with average tree diameters of over 7 inches were too few to determine whether the trend line would turn down, the rough, thickened bark of the larger stems is thought to be less suitable for oviposition.

Grouping according to number of stems per plot also yielded a strong correlation (fig. 2). As the number of stems per 1/10 acre increased beyond 40, the infestations decreased. As would be expected, the plots with higher stocking levels had smaller average d.b.h.'s.

No attempt was made to define a three-dimensional relationship between the infestation, average d.b.h., and stocking level because of the lack of a sufficient number of combinations. Even without a continuous range of stocking and d.b.h. combinations, however, the data show that poplar borer infestations tend to vary directly with stem diameter and inversely with density of stocking.

In managing aspen, therefore, intermediate cuts of any kind will probably increase borer damage. In Canada, even periodic removal of infested trees proved worse than no cutting, because the reduction in stand density caused an increase in new infestations. Apparently the best practice would be to maintain well-stocked stands and then to clear cut them at maturity.

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^{1/} Peterson, L. O. T. Some aspects of poplar borer infestations under parkbelt conditions. Canada Dept. Agr. Sci. Serv., Contrib. No. 2528, 6 pp., 1947.

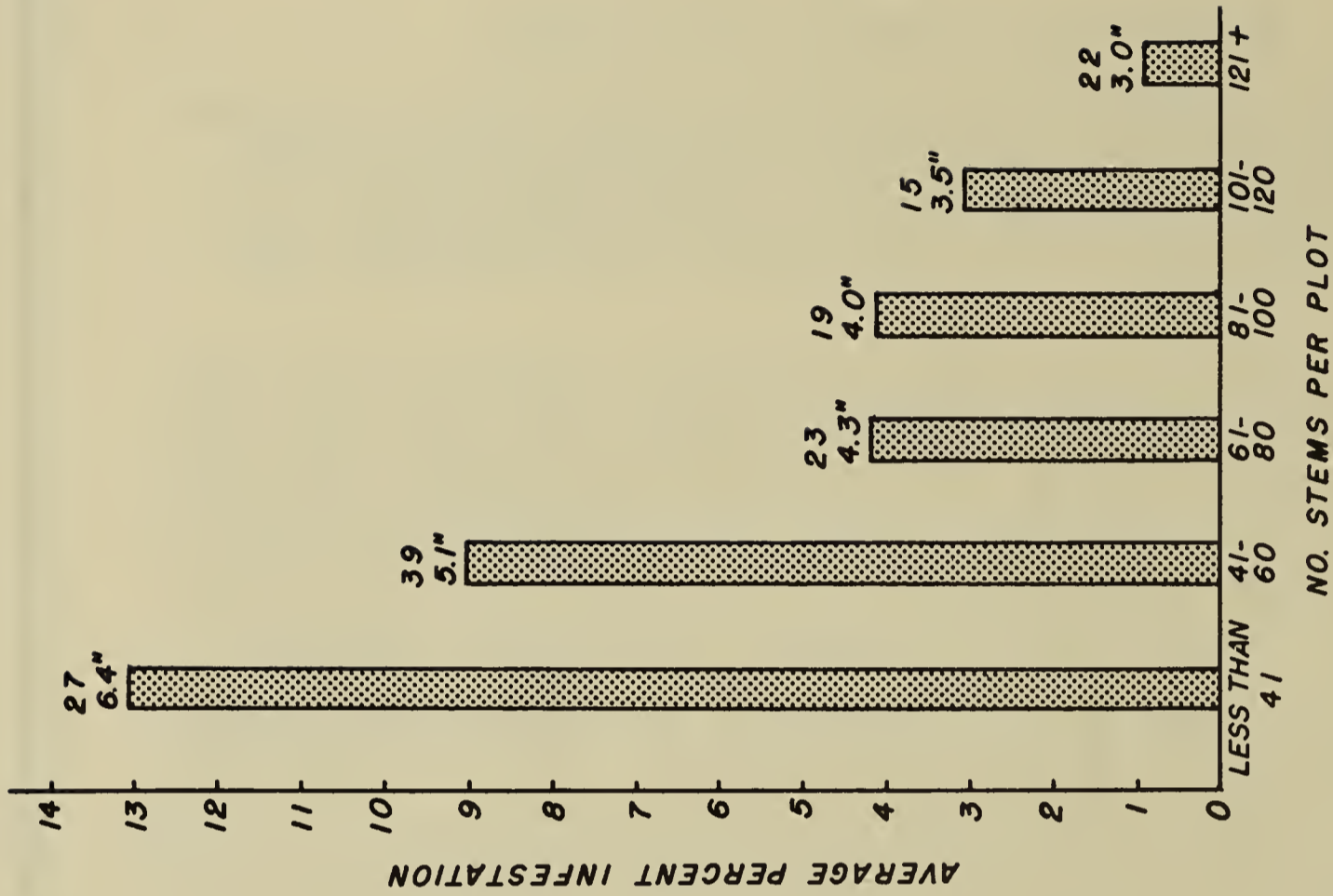


Figure 2.--Average percentage saperda infestation per 1/10-acre plot related to number of aspen stems per plot. Figures at top of bars show the number of plots and the average tree d.b.h.

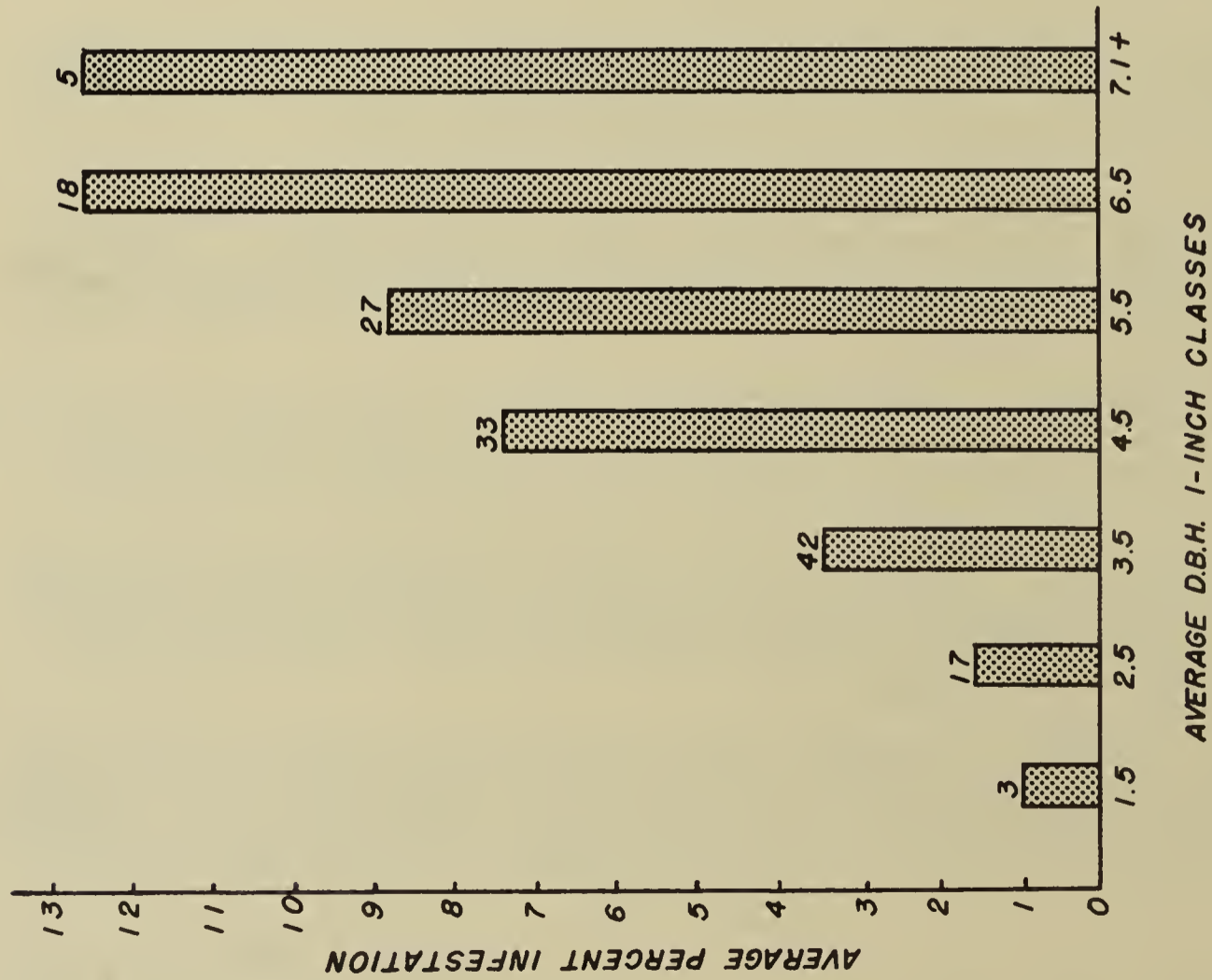


Figure 1.--Average percentage saperda infestation per 1/10-acre plot related to average tree diameter per plot. Figures at top of bars show the number of plots.